July 22, 1924. 1,501,951

J. B. KENNEDY

AIR PUMP FOR WELLS

Filed Oct. 31, 1922.

Fig. 1.

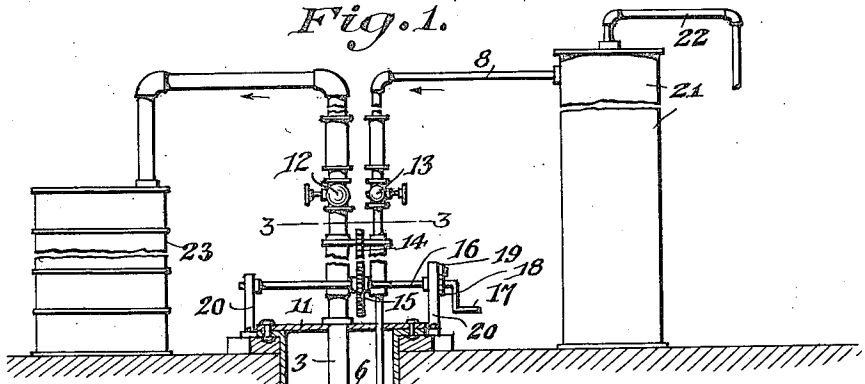


Fig. 3.

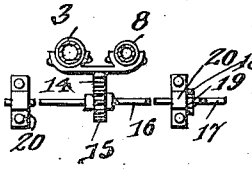


Fig. 2.

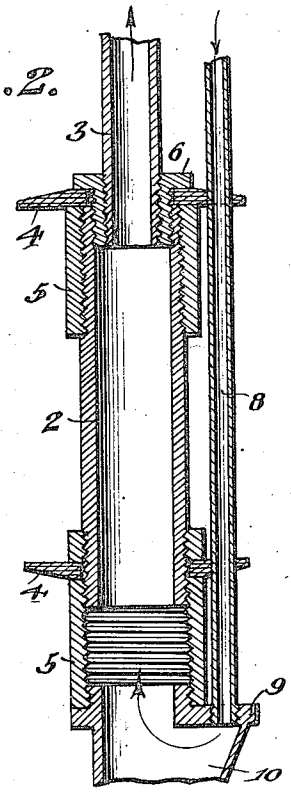
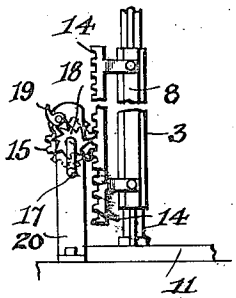


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES B. KENNEDY, OF BAINBRIDGE, GEORGIA, ASSIGNOR OF ONE-HALF TO H. G. BELL, OF BAINBRIDGE, GEORGIA.

AIR PUMP FOR WELLS.

Application filed October 31, 1922. Serial No. 596,143.

To all whom it may concern:

Be it known that I, JAMES B. KENNEDY, a citizen of the United States, residing at Bainbridge, in the county of Decatur and State of Georgia, have invented certain new and useful Improvements in Air Pumps for Wells, of which the following is a specification.

This invention has reference to improvements in air pumps for wells wherein a stream of air is injected into the water or other fluid in the well to propel the water or the like from the bottom of the well tubing to the surface of the fluid in the well to exert a buoyant action thereon and thereby elevate the water to the point of discharge.

The invention has special advantage in deep well installations to produce a constant action whereby to lift the water continuously and to avoid the use of pumping mechanism thus greatly cheapening and simplifying the pumping structure.

In accordance with the invention, there is provided a well casing usually of three inches diameter or of other stock size provided with a plurality of cylinders connected by intermediate pipes of relatively small diameter designed to conduct air from cylinder to cylinder, the cylinders being arranged in series and the air and the carried water discharging at the surface of the well where the water finally discharges into a suitable container.

The air is provided by a suitable air pump controlled by a faucet to regulate the quantity of air discharged. There is also a water faucet between the top of the well and the water container, and the cylinders and valves extend almost to the casing, for it is necessary that these valves press closely against the casing in order that there will be no loss of air for otherwise the flow would be a failure.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming part of this specification with the further understanding that the invention is not confined to any strict conformity to the showing of the drawing but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:—

Figure 1 is a more or less diagrammatic view showing a deep well pump embodying the invention.

Fig. 2 is a vertical section of a portion of the pump casing.

Fig. 3 is a section on the line 3—3 of Fig. 1.

Fig. 4 is a side view of the structure shown in Fig. 3.

Referring to the drawings there is shown a well casing 1 of the type usually employed in deep well structures and in the well casing 1, there are arranged a series of well tubing sections or pipes 2 of considerable size, say in the neighborhood of two or three inches in diameter and each of considerable length, and joined at the ends by smaller pipes 3, the pipes 2 and 3 being united in series, with the pipes or cylinders 2 carrying washers 4 near the ends, each of a size to engage the inner walls of the casing 1 to produce a close fit therewith.

The cylinders 2 have terminal couplings 5 threaded upon each end of washers 4 resting upon the upper end of each coupling, and clamped thereagainst in the following manner. The coupling at the lower end of each cylinder is formed in two parts 5 and 5′. The part 5′ is threaded on the cylinder, the lower washer is next passed over the end of the cylinder until it abuts the lower edge of the section 5′ whereupon the other section of the coupling is threaded on the end of the cylinder clamping the washer tightly between the two sections. At the upper end of the cylinder, the coupling 5 is threaded on the outer side of the cylinder, the washer 4 laid thereon, and an internally and externally threaded flanged collar 6 is then threaded into the interior of the cylinder until the flange bears down against the washer to clamp it in place. As shown in Fig. 2, the connecting pipe 3 is not connected directly to the cylinder but is threaded into the interior of the collar 6. The washers thus frictionally engage the walls of the casing 1, when the pipe line is placed in position.

The smaller pipes 3 each carry near one end a check valve 7 which will permit water to flow upwardly through the pipes 3

and cylinders 2 but hold the water from return flow downwardly.

Located within the casing 1 is a pipe 8 constituting an air pipe and which may be from a quarter inch to somewhat larger diameter and extending through a laterally extending ledge 9 forming the upper portion of a perforated terminal casing 10, secured to and suspended from the lowermost chamber 2 by means of the collar 5, which collar engages a flange 9′ upstanding from the surface of the ledge 9, so that air may enter the lowermost cylinder 2 by way of the pipe 8 and casing 10 and rise through the lowermost cylinder 2 to and through the next higher pipe 3 into the still higher cylinder 2 and so on through the series to the top of the well, the last or highest one of the water pipes 3 being normally carried by a cover plate or curb 11 supported by the upper end of the well casing 1.

The air pipe is passed through each of the washers, as shown, the air pipes thus being strengthened and steadied by this means.

Above the level of the ground, the pipe 3 is provided with a water faucet or valve 12 and similarly located so as to be as readily accessible, the pipe 8 is provided with an air valve 13.

The two pipes 3 and 8 are connected together by a rack 14 and gearing 15 united by a shaft 16 provided with a manipulating crank 17 so that the two pipes 3 and 8 may be lifted or lowered with respect to the well at will and in order to hold the pipes in adjusted elevation there is provided a ratchet 18 and a pawl 19 mounted on a supporting post 20 arranged to be carried by the platform 11.

At the upper end of the pipe 8 there is provided a tank or air drum 21 having a pipe connection 22 for receiving an air pump, not shown.

The upper end of the topmost pipe 3 after passing by the valve 12, is connected to a water container 23 located above the surface of the ground or in other accessible position.

When the air well pump is installed in a deep well, the length and number of sections used depends upon the initial depth of the well, being longer for a deep well than for a more shallow well and including a greater number of sections made up of the cylinders 2 and connecting pipes 3, each of which latter where entering a section 2 being provided with a check valve 7 opening upwardly.

Air is fed from the tank 21 through the pipe 8 to the strainer section 10 at the upper end of the latter and enters the lowermost cylinder 2 and finds its way by its buoyancy to the next higher pipe 3 and passes through the latter into the second higher cylinder 2 lifting the water above it.

In this way, the air bubbles passing upwardly through the top cylinders 2 and pipes 3 cause the bubbles to burst or shatter, thus preventing the bubbles from coalescing and forcing their way en masse through the water.

By the invention, the mass of air bubbles is subdivided and prevented from again coalescing by the smaller diameter of the intermediate pipes, to be again subdivided by the next cylinder and maintained in the subdivided condition until it reaches the surface of the ground or top of the well with no liability of coalescing in passing through the smaller pipes.

The air left pump of this invention differs from others of like character in that the rise of the air bubbles through the larger cylinders and smaller pipes superposed thereon, causes the bursting of the air bubbles without liability of again coalescing.

In relatively shallow wells, a single water cylinder with a superposed pipe thereon would be sufficient, while in deeper wells this arrangement may be repeated in accordance with the depth of the well, sometimes being repeated two or three times, and in some instances, three, four or five cylinders would be necessary to make a complete and satisfactory operation of the air pump.

The invention obviates the necessity of using more than one air pipe, but may employ a plurality of cylinders connected and separated by smaller air pipes through which the air streams are conducted in series with the cylinders.

The invention has the advantage over prior inventions of like character in that it is much more cheaply constructed and can be sold on a more reasonable basis to the consumer with a simplicity and cheapness of construction making the operation much more simple and the installation expenses less than any of the devices of like nature which have preceded it.

The installation of check valves is advantageous in subdividing the lifting of the water by the pump.

What is claimed is:—

1. In an air pump water conducting element, a lower terminal casing comprising a body portion having a closed bottom and one of its sides perpendicular and slotted, said body portion further including a top formed with an opening and an upstanding peripherally threaded annular flange for coupling the casing with the body portion of the conducting element flush with said opening, said top further having an opening positioned between the lower end of the flange and one end of the top for connecting an air supply pipe to the casing, and said top projecting laterally from the upper end of the body portion throughout to provide a flat ledge extending entirely around said flange.

2. In an air pump, a water chamber of a water conducting element formed of a cylinder peripherally threaded at each end and interiorly threaded at one end, a coupling surrounding the upper end of said cylinder, an interiorly and exteriorly threaded flanged collar threaded into one end of said cylinder and adapted to have threaded thereinto a connecting pipe section, a washer seated upon and clamped against the end of said cylinder and coupling by said collar flange, and a coupling at the lower end of said cylinder for connecting the same in a pipe line.

3. In an air pump, a water chamber of a water conducting element formed of a cylinder peripherally threaded at each end and interiorly threaded at one end, a coupling surrounding the upper end of said cylinder, an interiorly and exteriorly threaded flanged collar threaded into one end of said cylinder and adapted to have threaded thereinto a connecting pipe section, a washer seated upon and clamped against the end of said cylinder and coupling by said collar flange, a coupling at the lower end of said cylinder for connecting the same in a pipe line, a two-part coupling threaded upon the lower end of said cylinder, and a washer surrounding the lower part of said cylinder and clamped in position between the parts of said lower coupling.

In testimony whereof, I affix my signature hereto.

JAMES B. his × mark KENNEDY.

Witness:
EUNICE GRIFFIN.